ADDRESS

by

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At the

Dedication of the Robledo II Facility

Of the Madrid Space Station

May 10, 1974

Opening Remarks

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Thank you, General Azcarraga. (Assuming the General introduces Dr. Fletcher.)

Your Royal Highnesses, Mr. President of Government, Mr. Minister Mr. Ambassador, Ladies and Gentlemen.

On behalf of the ~~National Aeronautics and Space Administration~~ President of the United States, I wish to join General Azcarraga in welcoming you here today, and I thank you for coming.

I especially wish to thank the Prince and Princess and the President of Government for their participation in our ceremonies today. We are deeply honored, and ~~the cause of space exploration~~, ~~as well as~~ the cause of Spanish-American friendship, is greatly strengthened by their presence and their support.

~~ROBLEDO II: SPACE AGE TOOL AND SHINING SYMBOL~~

We are here today to dedicate a magnificent piece of Space Age machinery and a high technology tool for exploring and using space. Even in this time of technical marvels, it is outstanding. And it works. It works like a fine watch.

I am only an engineer, and therefore practical-minded; but nevertheless I must confess a sense of awe when I think about what this Robledo II facility can do when operated by highly qualified personnel as part of a world-wide system for space discovery.

Visiting here today I can feel once again some of the excitement and wonder I felt as a school boy when I read of the great voyages of exploration sent out by Spain ~~and other countries during the 15th and 16th centuries~~ -- particularly Christopher Columbus ---, or when I stood for hours on the streets of New York to see Charles Lindbergh come by.

I confess, too, that I find this giant structure, this bridge to the planets, beautiful in an esthetic as well as a technical sense. I am sure the setting has something to do with that, and the atmosphere of hospitality and good will that prevails here today.

We ~~will~~ recognize that this giant antenna, linking planet Earth with the far reaches of the Solar System, is an excellent symbol of the good relations enjoyed by Spain and the United States and the close cooperation of our two countries and their citizens in many fields.

These close ties have been emphasized by General Azcarraga and will, I am sure, also be stressed by Ambassador Rivero.

For my part in this ceremony, as representative of NASA, I would like to ~~concentrate~~ focus on what Robledo II symbolizes for those of us engaged directly in the space effort, over and above its great utility as a communications tool.

-- We see Robledo II as the product of highly successful cooperation over many years between NASA and INTA.

-- We see it as a monument to the high competence and professionalism of the Spanish engineers and managers who operate it.

-- We see it, too, as a reminder of the growing importance of international cooperation in space exploration and use.

-- Finally, we see Robledo II as the tangible expression of the intention of the United States and Spain to work together to explore the Solar System during the foreseeable future and no doubt far beyond. I will describe, later on, some of the expeditions we have in mind which this new facility has made possible.

It was a major decision for our Government and the Spanish Government to put this giant new antenna here in the heart of Spain, near the edge of two great continents. It was not a decision to be lightly made. But on our part, and I think on the Spanish part, too, it was nevertheless an easy decision to make, because it was based on long and happy experience in space cooperation between our two countries, beginning in the Canary Islands in 1960 and here at the Madrid Space Station in 1964.

This period of cooperation has been short in ~~calendar~~ years, but very long in terms of Space Age history.

Spanish personnel at the Canary Island and Madrid stations have participated in almost every major NASA mission in Earth orbit, on the Moon, or at the planets, and we are indeed very grateful for their help.

Our joint decision to begin the Robledo II facility here in 1970 has been fully justified in every respect. It is good to be able to say in this distinguished company today that we and our Spanish colleagues are even better friends at the completion of this difficult project than at the start. Robledo II was completed on schedule and within the original cost estimates. That does not always happen these days, but we take great professional pride at NASA in trying to make it happen, and we know that INTA shares that approach.

Getting ground facilities built on time, and at reasonable cost, is only the beginning of a successful space program. But it is very important. It gives Members of Congress and taxpaying citizens confidence in our professionalism and our realism.

So to our Spanish colleagues who helped build this station and began operating it in time to communicate with Pioneer 10 at Jupiter last December and Mariner 10 at Venus and Mercury in February and March, I wish to express, on behalf of NASA, our deepest gratitude and our highest admiration.

I would like to pay them the highest compliment we ever pay in professional circles, and that is to say: "From all of NASA, Well done."

In this connection, it is interesting to note that the Robledo I facility received the first TV pictures of the surface of Mars from Mariner 4 in 1965 and the new Robledo II facility received the first TV pictures of the surface of the mystery planet Mercury from Mariner 10 just two months ago. Those are bright new pages in Spain's illustrious history as an exploring nation.

Quick action by the personnel here at Robledo II also helped save the Mariner 10 mission from disaster in early January. For some unknown reason, the spacecraft's primary power system suddenly failed while in view of the Madrid station. The operating personnel here reacted quickly, correctly diagnosed the problem, and made the necessary adjustments. A minimum of data was lost, and the spacecraft has gone on to carry out its mission with brilliant success using the back-up power system.

At the present time, Mariner 10 is on its way around the Sun, and will again pass close to Mercury in late September, and we hope to get even better data then because of what we learned in the March encounter. So we have Pioneer 10 on its way completely out of the Solar System and Mariner 10 paying a second visit to Mercury. But what these remarkable spacecraft see and record would be completely useless to us without ~~our three~~ this giant antenna and the people who operate ~~them~~ it.

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You know, we used to make a sharp distinction between manned and unmanned (or automated) spacecraft. But we are coming to realize more and more that this is an artificial distinction, that all our spacecraft are "manned"; it is just a question where the men sit. So when Pioneer 10 went past Jupiter, or Mariner 10 passed Mercury, some of the crew were right here at Robledo II -- Earthbound Astronauts as we call them.

Now I would like to share with you another feeling I have about Robledo II: it illustrates how right Columbus was, in Space Age terms. If the world were flat, NASA could make do with one big antenna system in California. But because the world is round, a lone antenna would be like a giant Cyclops, blind and deaf two thirds of the time. So this new antenna at the Madrid Space Station, together with the other two in Australia and California, draws attention to the fact that the exploration and use of space not only encourages international cooperation but requires it.

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I am pleased with the growing emphasis on international cooperation in space. Competition with the Soviet Union got us off to a good start; it may still be important from time to time as a spur and as a measure of what one can do if need be. But I believe that much more can be accomplished by friendly international cooperation in space than by narrowly focused national rivalry.

In looking through a history of Project Mercury the other day, I was amused by a cartoon about Enos, the Chimpanzee whom we sent into orbit shortly before John Glenn. The cartoon shows Enos leaving the Mercury capsule after orbit with a big grin on his face, and he says to another chimpanzee: "We're a little behind the Russians and a little ahead of the Americans." Those days seem a long time ago.

The more demanding space missions of the future, such as setting up scientific bases on the Moon or sending men to Mars or building very large space stations in Earth orbit, will be very expensive. They will probably be too expensive for any one country to undertake in the foreseeable future. So I am hopeful that such demanding missions, when we are ready for them, can be undertaken on the broadest possible international basis.

In the meanwhile, we are very pleased at NASA with the decision by the European Space Research Organization (ESRO) to cooperate with us on design and development of the manned Spacelab module that will be used with the Space Shuttle Transportation System in Earth orbit in the 1980s and 1990s. ESRO is making excellent progress toward bringing Spacelab into development. We are also very glad to know that Spain is taking an active part in this tremendously important international project.

We are also looking forward to the launch of the first Spanish scientific satellite, INTASAT. Your satellite is ready for launch as scheduled in July.

I know it will be a pleasure for your own space station personnel to be tracking and talking with a Spanish satellite. A young friend of mine says that if INTASAT works as well as as his Bultacco motorcycle it will be a great success.

One of the most useful things we expect to receive from our study of other planets is a better understanding of Earth's atmosphere and weather and the forces that influence them. The Spanish INTASAT will contribute to that understanding, too.

Now I want to come back to what is probably the most important thing this new Robledo II facility symbolizes. That is the determination of the United States, with the help of Spain, Australia, and other nations, to continue our exploration of the Solar System during the next two decades with missions of ever increasing difficulty and, I believe, ever increasing interest and value.

When Pioneer 10 flew past the giant planet Jupiter last December it sent a wealth of scientific data back to Robledo II and the other big antennas of our Deep Space Network.

This scientific treasure included more than 150 close up pictures of Jupiter's colorful cloud bands and its mysterious Red Spot. This huge Red Spot, which looks small on the disc of Jupiter, is big enough to cover three planets the size of Earth.

The new information from Jupiter is fascinating. It will take some time yet to analyze it all and understand it. But already it appears that Jupiter is a sort of second Sun that was not quite large enough to "catch fire" as our Sun did. It even has its own system of planets like a Sun should have. And it emits 2 1/2 times as much energy as it receives from the Sun.

Now Pioneer 10 is continuing on its course out of the Solar System. If the spacecraft continues to operate, and if the sensitivity of Robledo II and the other big antennas lives up to predictions, we will continue to track Pioneer 10 until it passes the orbit of Uranus, a distance of about three billion kilometers (~~3,000,000,000 km~~) from Earth. That will be in 1981. Then we will have to bid Pioneer 10 goodby. But it will, of course, continue its journey out among the stars until perhaps it is picked up by some unknown observer many eons from now. Pioneer 10 carries a message made up of pictures and scientific codes which will tell any intelligent finder where it came from and how long it had been travelling.

One can imagine the excitement there would be at this Space Station eons hence when the news comes in that Pioneer 10 has found a safe harbor.

It is a great technological accomplishment to be able to communicate with Pioneer 10 as far as Jupiter and beyond.

The transmitters on Pioneer 10 have a power output of only 8 watts, which is less than an ordinary light bulb. And by the time these 8-watt signals get back to Madrid from Jupiter or Saturn they are incredibly weak. Only a tiny fraction of a watt. One quadrillionth of a watt, I have heard it said. Or 10^{-12}. Collected for 19 million years, this tiny amount of energy would light a Christmas tree bulb for only one-thousandth of a second.

So that is why we have this big dish here at Robledo II. That is why we are so proud of our far away spacecraft and of the way this station tracks them and talks with them.

Let me give you another example of the skill of our space navigators and communicators.

The sister ship of Pioneer 10 -- Pioneer 11 -- is now on the way to Jupiter. It will arrive in December. We recently made a decision that should greatly increase the discoveries Pioneer 11 will make.

We sent it orders to fire its thrusters for 43 minutes and 36 seconds, and increase its speed by 230 kilometers per hour. This will send it much closer to Jupiter -- within about 40,000 kilometers -- so that it can use Jupiter's gravity to change course and fly close to Saturn, too, in September of 1979.

This was a little like sending a message to Columbus on his second voyage to sail around South America and on around the world.

This change in the itinerary of Pioneer 11 was possible because we had learned so much about Jupiter from Pioneer 10. It was also possible because we could deliver the orders to change course via the big antennas and the skilled operators of the Deep Space Network.

Later on we will have to make a new decision whether we want to send Pioneer 11 into the mysterious and beautiful rings of Saturn. At least they are beautiful when seen through a telescope on Earth. But recent radar observations indicate that they may be composed of large chunks of rock flying close together. Well, we have time for that decision. Pioneer 11 will not reach the vicinity of Saturn until 1979.

In 1977 we plan to launch two Mariner spacecraft to fly by both Jupiter and Saturn. These Mariners will be nearly three times larger than Pioneer 10 and 11.

Within the next two decades we plan to put spacecraft in orbit around Jupiter and to land TV cameras and other instruments on one of Jupiter's moons. We are also very much interested in a landing on Titan, the largest moon of Saturn. These are tentative plans, but they give you an indication of the kind of work we will have for Robledo II for many years to come.

In the meanwhile, Robledo II and other stations of the Deep Space Network will be very busy on our most exciting planetary mission for this decade, the launch of two Viking spacecraft to Mars in 1975 which will land on Mars in 1976.

Each Viking spacecraft will consist of two parts -- an orbiter and a lander. If all goes well, that means by mid-1976 Robledo II and the other stations will have four spacecraft to track and communicate with on or near Mars. There will be television pictures from the surface and perhaps -- this will really be exciting to all the world -- perhaps the first evidence of life on Mars. Our Mars landers will be well equipped laboratories which will scoop up soil samples and perform sophisticated chemical and -- we hope -- biological analyses of these samples.

I would like to tell you much more about our other plans to explore the planets in the next two decades, and to rendezvous with comets. Or about the large new astronomical observatories and Earth observatories we plan to establish in Earth orbit when the Space Shuttle comes into use at the end of this decade. But our time today is limited. I must close. And it is a fact that our firm plans and our tentative plans for the next two decades are now well documented, and we will be glad to share them with anyone here who is interested. If they are not already available at the Station here and at INTA, just ask Mr. Truszynski to send some over.

You will find in them ample evidence ~~that the~~ personnel of the Madrid Space Station will be extremely busy in the years to come, and that the Robledo II facility will be well used in one of ~~the~~ great technological and intellectual enterprises of our time.

In ~~closing~~, I wish to tell you once more how very glad and very grateful we are to be partners with Spain and Spanish people in these new voyages of exploration that are so much like those of 500 years ago in their challenge to the mind and the spirit of Man.

The big difference, perhaps, is that the people who work here today can live at home while exploring Mars and Jupiter. And people throughout the world, thanks to facilities like Robledo II, can participate in these adventures <u>almost</u> as fellow passengers.

I thank you!

AND NOW - - -
GIFT TO HIS R.H
PRINCE OF SPAIN